

BOOK REVIEW FOR *PHYSICS TODAY*

Encyclopedia of Astronomy and Astrophysics. Vols. 1-4, edited by Paul Murdin.
Institute of Physics Publishing and Nature Publishing Group 2001 \$650.00

This massive reference work (hereafter, "*EAA*") summarizes a great deal of what we knew in the astronomical sciences at the most recent Millennium. An associated website may keep much of it up-to-date for years to come. The contents are extensive indeed: the index alone consists of 76 pages, each with three columns of fine-type listings, and there are "nearly 700 main articles" in the words of Editor-in-Chief Paul Murdin, who was assisted by Editorial and Advisory Boards comprising 33 persons, most of them prominent astrophysicists, but including the celebrated amateur astronomer Patrick Moore.

The main articles are what make *EAA* worthwhile. They are generally by experts, who took much care in their preparation. Impressive examples are "Stellar Evolution" by J. Christensen-Dalsgaard and "Venus: Interaction with Solar Wind," by C.T. Russell and J.G. Luhmann. The degree to which the articles are illustrated and referenced, however, seems to depend on the inclination of the individual author. "Blue Stars at High Galactic Latitudes" by J.S. Drilling is less than four and one-half pages long, cites nine previous works from 1965 through 1998, but is not illustrated. "Proper Motion: Optical/Infrared" by A. Klemola runs seven pages, with two small geometric diagrams and six bibliographical citations and includes a table of large astrometric catalogs with 20 footnoted references. On the other hand, articles on Saturn's rings and on its satellites are heavily illustrated, but with just two or three citations in each.

The coverage of solar physics is especially thorough in *EAA*. There are numerous articles on major topics, notably in the physics and phenomena of the corona and the chromosphere, and some on more specialized areas, such as "Polar Plumes" and "Coronal Cavities." The latter are not to be confused with the subject of another entry, "Coronal Holes." Finding all these articles is another matter; the reader is advised to make good use of that 76-page index. Although five main articles begin with "Coronal" and thus are grouped together, you have to look in another volume to find the main entries on coronal mass ejections or X-ray bright points, here presented under "Solar Coronal Mass Ejections" and "Solar Corona: X-ray Bright Points."

The economics of producing scholarly encyclopedias are such that contributors are rarely paid what their articles are worth, if paid at all. So in the final analysis, the editor recruits only those articles that authors are willing to write. There's no question as to quality on the main articles in *EAA*, but some obvious topics are lacking. There are cogent articles on "Dynamo Theory," "Geodynamo," and "Dynamos: Solar and Stellar," but no survey of the important topic of planetary dynamos, although they are briefly mentioned under "Planetary Magnetospheres." There are many superb articles on galaxies in *EAA*, but none on the low-surface brightness galaxies that represent one of the hottest topics in current work.

The hundreds of unsigned shorter entries are more of a mixed bag than the main articles. They range from seven lines on "Coronelli, Vincenzo Maria (1650-1718)," about the cosmographer from Venice who "Made two beautiful globes for Louis XIV, 3.9 m in diameter, the biggest in the world until the present century..." to "Black Hole," about two-thirds of a page. They fall into various categories, some providing simple definitions as in entries on "Direct Motion," "Rille," and "Revolution," while others give short descriptions of well known celestial sights, like "Betelgeuse," "Big Dipper," and the constellation "Columba," or of important, but not readily glimpsed, astrophysical objects, such as "Becklin-Neugebauer Object." Brief articles on observatories represent still another category. Some, as in "Beijing Astronomical Observatory," include the URL of the observatory website where more information is available, while others, like "San Fernando Observatory" lack this helpful feature, although the observatory has an equally fine presence on the WWW. Still other categories include very short articles on individual spacecraft and spacecraft series, on individual annual meteor showers, and so on.

My concern about *EAA* centers on the short entries. The simple definitions are no more informative than those in handy single-volume astronomy dictionaries, such as Jacqueline Mitton's *Cambridge Dictionary of Astronomy*, which can be found on many an astronomer's or science writer's desk. Guess where I would look up those definitions. The entries on meteor showers, such as "Eta Aquarids," lack crucial details, such as hourly meteor rates and specific occurrence dates. Much more helpful information appears in tabular form in college textbooks and numerous publications for amateur astronomers. Entries on spacecraft are sometimes disappointing too: contrast the 15-word entry on "Dynamics Explorer (Explorer 62 and 63)" in *EAA* with the illustrated, six-paragraph entry in Robert Zimmerman's single-volume *The Chronological Encyclopedia of Discoveries in Space*.

The biographies of living scientists in *EAA* are rarely more comprehensive or detailed than those available from standard sources. You can't be misled by *EAA*'s four lines (and one word more) on "Rubin, Vera Cooper (1928-)," the contemporary investigator of velocity fields in galaxies, but neither will you be well informed on this much-honored astronomer's accomplishments. The 21-line entry on "Sandage, Allan Rex (1926-)" has no room for the famous controversy over the Hubble constant in which Sandage was a central figure, nor for the discovery of blue stragglers, reported in his Ph.D. thesis. In the latter case, fortunately, what is unmentioned in the biographical entry can be found in the *EAA* main article, "Blue Stragglers."

If *EAA* were magically compressed into a single manageable volume, the myriad short entries would make more sense; the book would be "one-stop shopping" for astronomical and astrophysical reference reading. But since almost all copies of *EAA*, at four volumes and \$650 the set, will necessarily be found in reference libraries, why include the short entries? If you are in the library, it's a lot easier to pick up a single volume appropriate to meteor showers, or a Mitton *Dictionary*, a Zimmerman *Chronological Encyclopedia*, etc. I'd still go to the library to consult the main articles in *EAA*- they're a splendid resource,

but the *Encyclopedia* would have been more user-friendly if the short stuff had been omitted.

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